Schnoebelen, D.J., Becher, K.D., Bobier, M.W., and Wilton, T., 1999, Selected nutrients and pesticides in streams of the Eastern Iowa Basins, 1970-95: U.S. Geological Survey Water-Resources Investigations Report 99-4028, 65 p.

Abstract: Water-quality data from 17 surface-water monitoring sites were complied for 1970 through 1995 and analyzed to determine historical water-quality conditions and possible trends in the Eastern Iowa Basins study unit as part of the U.S. Geological Survey's National Water-Quality Assessment Program. The Eastern Iowa Basins encompasses the Wapsipinicon, Cedar, Iowa, and Skunk River Basins and covers about 19,500 square miles. Seven of the monitoring sites were sampled by the Iowa Department of Natural Resources, three sites by the Minnesota Pollution Control Agency, three sites by the University of Iowa Instituted for Hydraulic Research, and four sites by the U.S. Geological Survey. Water-Quality analyses typically consisted of nitrate, ammonia, total nitrogen, and total phosphorus, with limited analyses available for organic nitrogen, dissolved phosphorus, dissolved orthophosphate, and water-soluble pesticides. Long-term historical nutrient and pesticide data were not available for the Wapsipinicon River Basin.

Median concentrations for total nitrogen ranged from 4.6 to 9.4 milligrams per liter, and maximum concentrations of total nitrogen ranged from 4.6 to 31 milligrams per liter. The majority of nitrogen transported in surface waters of the Eastern Iowa Basins study unit is in the form of nitrate (nitrogen). Median concentrations of total phosphorus ranged from less than 0.10 to 0.66 milligram per liter, and maximum concentrations of total phosphorus ranged from less than 0.10 to 5.4 milligrams per liter.

Nitrate varied seasonally. Median concentrations of nitrate were largest during the spring and the winter (6.0 to 7.0 milligrams per liter) compared to the summer and fall (2.0 to 4.0 milligrams per liter). Concentrations of nitrate greater than 10 milligrams per liter typically occurred during spring runoff. Median ammonia concentrations generally were highest during the winter (approximately 0.3-0.5 milligram per liter) compared to the spring and summer when ammonia concentrations were often close to the detection limit (0.01 milligram per liter). In general, the median concentrations of total phosphorus varied less than 0.1 milligram per liter between seasons.

The statistical analysis of the nutrient data typically indicated a strong positive correlation of nitrate with streamflow. Total phosphorus concentrations with streamflow showed greater variability than nitrate, perhaps reflecting the greater potential of transport of phosphorus on sediment rather than in the dissolved phase as with nitrate. Ammonia and ammonia plus organic nitrogen showed no correlation with streamflow or a weak positive correlation. Seasonal variations and the relations of nutrients and pesticides to streamflow generally correspond with nonpoint-source loadings, although possible point sources for nutrients were indicated by the data at selected monitoring sites. Statistical trend tests for concentrations and loads were computed for nitrate, ammonia, and total phosphorus. Trend analysis indicated decreases for ammonia and total phosphorus concentrations at several sites and increases for nitrate concentrations at other sites in the study unit.

Long-term pesticide data are lacking in the study unit. Atrazine was the most commonly detected pesticide. Maximum concentrations of pesticides usually occurred after spring runoff. Large streamflows during the late summer do not have pesticide

concentrations as large as do similar streamflows during the spring that occur soon after the application of pesticides.